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(54) Denture repair

(57) A denture repair involves first abrading the edges of cracked denture pieces prior to their actual rejoining. Thus there is a notch along the crack-line (notch technique), and this notch is then filled with a very fast-curing methacrylate based polymer/monomer system by alternate layering of the monomer and polymer (layer technique). As a consequence no mixing is required, there is no flashing or roughness on denture's occlusal side, there is also very good denture piece alignment, and there's reduced possibility of subsequent dental complications.

The layer-technique is also recommended for fixing loose or dislodged teeth of denture.

The notch and layer techniques can also be used for the repair of other rigid plastic (particularly acrylate based) surfaces and components.

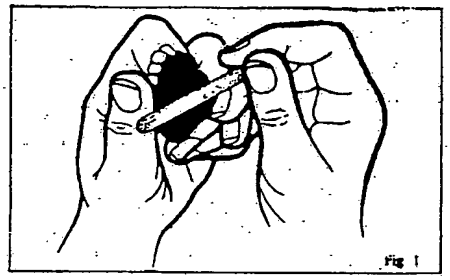
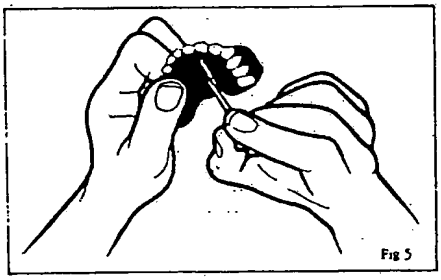


Fig 1



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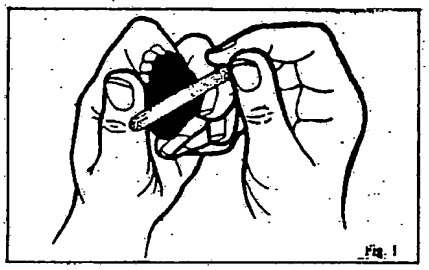
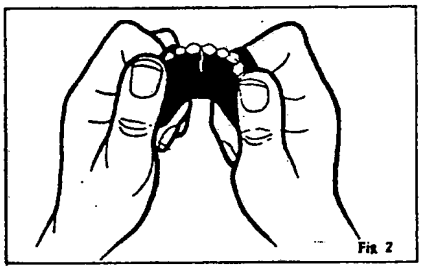


Fig. 1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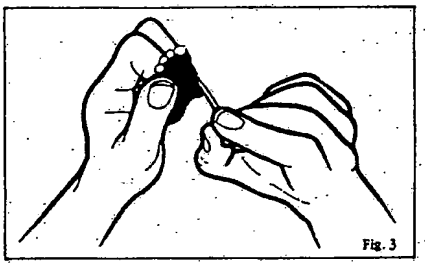
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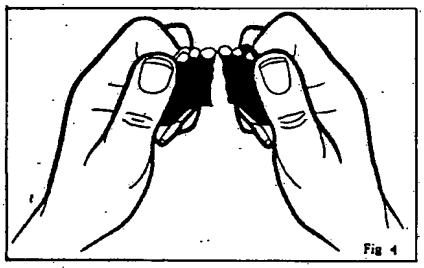
Fig. 4

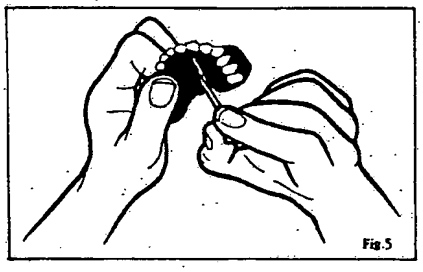
Fig. 5

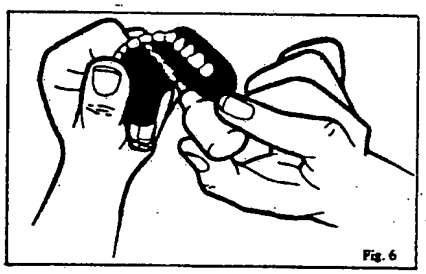
Fig. 6

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AN IMPROVED DENTURE REPAIR TECHNIQUE

This invention relates to an improved denture repair technique.

Background

Currently broken dentures can be repaired professionally by dentist or dental technician or by the use of a home repair kit. Professional repairs tend to be expensive and not always easily available. The present home repair kits tend to be difficult to use and frequently give inaccurate and shody repairs. Ideally a denture repair kit is required which can be used by unqualified persons in a very short time (e.g. less than 45 min), to provide a permanent repair which does not subsequently lead to dental complications.

Essential Technical Features

The proposed new kit comprises an acrylic resin system, abrasive boards and a adhesive, and these can be represented as follows:

i) Acrylic Polymer, namely a methacrylate polymer with adjuncts of ethyl-, methyl-, butyl- and/or similar hydrocarbons with a molecular weight of 1.54×10^6 or less, and a particle size of 30μ or less.

ii) Acrylic monomer, namely a methacrylate with adjuncts of ethyl-, methyl-, butyl- and/or similar hydrocarbons. This monomer is best stabilized with say 0.006% hydroquinone to prevent premature polymerisation during transport and storage.

In the polymer and monomer described above enough catalyst and initiators are admixed so as to bring about a free radical reaction when the two are mixed, and the resulting mixture having a dough time of 1 to 4 minutes and a cure time of 6 to 30 minutes at 23°C ambient temperature. Examples of such catalyst and initiators are organic peroxides such as benzoyl peroxide at 1 to 3% in polymer, and tertiary amines such as N-N-Dimethyl-p-toluidine at 0 to 1% in monomer.

iii) A low viscosity plastic compatible, particularly methacrylate compatible, adhesive with a cure time of 8 to 50 secs. Such a material can be a methyl-, ethyl-, or butyl- cyanoacrylate monomer with a viscosity of 50 to 160 M. PaS.

iv) Stiff abrasive boards of such dimensions so as to allow them to be easily held when abrading the edges of cracked dentures

The invention requires the polymer to be presented in a plastic squeezy type bottle with a small orifice nozzle. This way when bottle is inverted and gently squeezed a jet of polymer with a diameter of 1 to 3mm is emitted. The monomer also needs to be specially presented, and this is essentially in a small container with a plastic or glass dipstick or pipette incorporated within the cap.

According to present invention the denture pieces need to be first prepared, this is done as follows: Using abrasive boards the top edge of cracked pieces are abraded back at a slope, to the extent of 2 to 5mm. Using the adhesive the cracked pieces are then joined together whilst also trying to ensure 100% alignment of the pieces. The joined denture is then tried in mouth for correct seating, if this has not been achieved then denture is simply snapped apart along the join and re-alignment with adhesive re-attempted.

Once alignment and good seating in mouth has been achieved then the denture is said to have been prepared for the actual repair.

The repair is affected as follows: The initial abrasion of cracked edges of denture pieces should give rise to a narrow notch in denture along the crack. This notch is wetted with monomer using the applicator built within the cap of monomer bottle. Infact a simple dap of the wetted applicator is all that is required since capillary action of notch will ensure the spreading of monomer. Using the polymer bottle adequate amount of polymer is sprayed into notch so as to soak up all the monomer. The excess is simply blown away. The notch is then re-damped with monomer using the applicator, and polymer sprayed into the notch again. This method of repair is termed the layer-technique, and the technique is continued until the notch is filled with monomer and polymer to a very slight excess. This repair using the layer technique is superior over other existing methods since it requires no prior mixing of polymer and monomer, and also because the repair would have insured very good denture alignment and thus correct seating in mouth. The repair also eliminates roughness and flashing on inside (filting side) of denture and thus reducing possibility of dental complications through the repair. Due to the efficiency of layer-technique polymer/monomer reaction systems can be employed with fast dough and cure times, and thus making it possible to have a repair in under 40 minutes.

Using the layer technique loose or dislodged teeth can also be fixed by simply filling the tooth cavity via the layer technique, and subsequently pressing the dislodged tooth into it.

Example 1

i) Denture preparation. Using the abrasive board gently rub out a small slope along cracked edges of dentures. Make these slopes only on the non-fitting surface of denture, never disturb the fitting surfaces (i.e. never modify the surface of denture which actually sits against the mouth). Additionally, when forming these slopes do not remove more than half the thickness of denture and always leave at least 3mm gap from end of denture and beginning of slope.

ii) Now hold the two pieces of denture together and join it along the crack. A notch should appear on the non-fitting side of denture. (fig. 2).

iii) Carefully open the adhesive bottle, turn it upside down and gently squeeze it so that some adhesive is pushed out of the hole. Dab the adhesive a few times onto one of the cracks (fig. 3) and rejoin the denture carefully so that the two pieces come together perfectly without any ridges forming along the cracks apart from the notch originally cut out. (alignment).

iv) Next rinse denture under clean running tap-water and place in mouth. Without applying too much force move jaws from side to side and up and down. If denture sits and feels in mouth as it felt prior to breakage then carry on onto stage five. If denture feels uncomfortable then it most likely requires re-alignment, this is done by simply snapping the join apart (fig. 4) and restarting from stage iii).

v) After having aligned the denture, dry it and continue as follows: Dampen the notch with monomer a few times. An applicator is enclosed in the bottles cap to make this easy and all that is required is to touch it's damp tip into the notch (Fig. 5).

vi) Before the liquid has time to evaporate from notch carefully spray into cavity the polymer. Do not over fill the notch and try not to spray it too much onto the outside (fig. 6). Gently blow away the excess powder and slightly wet the remainder powder with liquid using the applicator. Next spray on a smaller amount of powder and after having blown away the exces, just again slightly dampen this new lot of powder with liquid.

vii) Finally leave re-joined denture in warn water for about 30 min during which time the acrylic base would have had time to cure.

Example 2

Loose or dislodged denture teeth can be replaced as follows.

i) If tooth on denture is loose, jointly move it from side to side whilst at same time pulling it away from the denture.

ii) Wipe dry both tooth and tooth's slot in denture, and then using monomer applicator, wet the tooth's slot and the fitting surface of tooth, leave for 30 secs.

iii) Then using layer-technique place two alternate layers of monomer and polymer in the tooth's slot.

iv) Gently press in the tooth into the slot and then position it so that it is in line and at right height with the adajcent teeth.

v) Hold the tooth in position for 1 minute, and then place whole denture in glass of warm water for 30 minutes.

vi) Finally, using abrasive boards carefully abrade away any excess polymer/monomer dough that may have squeezed out when the tooth was being positioned.

We Claim

i) The notch technique where for example only top edges of cracked plastic (e.g. denture) pieces are abraded so that when pieces are rejoined at the crack a notch appears along the crack-line.

ii) A denture repair kit which by employing the notch technique does not leave the repair media on the fitting (the occclusal) surface of denture in the form of flashing or roughness.

iii) The use of very fast curing (i.e. less than 30 minutes) methacrylic polymer/monomer system in the repair of dentures, as well as other plastic surfaces and components.

iv) The layer-technique where layers of polymer and monomer are systematically layered on one another and thus overcoming the need to initially mix them.

v) A denture repair kit where no separate mixing of polymer and monomer is required.

vi) A denture repair kit as claimed in any preceding claim, wherein the notch and layer techniques are employed to affect the denture repair.

vii) The use of abrasive boards as opposed to abrasive cloth or paper to abrade surfaces or edges of dentures.

iix) The use of polymer/monomer systems in conjunction with layer technique to fix loose or dislodged teeth from dentures.

ix) The use of methacrylate polymers/methacrylate monomers in conjunction with notch technique and layer technique to repair cracked and broken methacrylate surfaces and components.

x) The use of polymers/monomers in conjunction with notch technique and layer technique to repair cracked and broken plastic surfaces and components.

xi) A repair kit which embraces all the claims to repair broken dentures or other similar plastic components.

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